REBUTTAL TESTIMONY OF ROBERT W. CRANDALL

JUNE 20, 2003

CRITERION ECONOMICS, L.L.C.

1. My name is Robert W. Crandall. I am submitting this testimony in the Rebuttal Phase of the 1998 and 1999 Cable Copyright Arbitration Royalty Proceedings. I have submitted written and oral testimony in the Direct Phase of this proceeding. My qualifications are set forth at paragraphs one through five of my written testimony in the Direct Phase.

2. I am offering this testimony on behalf of JSC in my individual capacity and not as employee of the Brookings Institution, which does not take institutional positions with respect to specific legislation, litigation, or regulatory proceedings.

3. The purpose of my testimony is to respond to certain questions from the Panel and to comment on certain studies and testimony presented during the Direct Phase.

I. The Bortz Survey Closely Represents the Outcome of a Hypothetical Marketplace for Distant Signal Programming

4. In Question 2,[1] the Panel asks whether the Bortz survey, conducted with cable operators buying programming in a regulated market, "provides an accurate measurement of the decisions that buyers would make in a free market." The short answer to this question is "yes."

5. In an unregulated market, it is possible that the mix of programming purchased would be different from the mix purchased in the regulated market. It would be difficult, if not impossible, for the Panel to assess the value of that hypothetical program mix that might be purchased in the free market. Rather, the Panel should assess the value of the programming actually purchased. That is what the Bortz survey does. The Bortz survey strikes the right balance between the actual choices in a regulated market (by conditioning its results on the

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1. *See* Order (June 4, 2003), Appendix A.

actual programming choices made) and the hypothetical nature of a free market (by asking the cable operator how it would allocate its budget across programming categories if such a choice were possible). Without some grounding in the actual choices made by cable operators, it would be impossible to say anything about the hypothetical market for distant signals.

6. There are also several possible structures for an unregulated market. The sellers might be individual copyright owners, broadcast stations selling packaged signals, or collectives of the sort representing claimant groups in this proceeding. The buyers might range from an individual cable system or a multiple cable system operator to a collective of multiple system operators bargaining jointly (such as the National Cable & Telecommunications Association, which bargained with ASCAP on behalf of all cable systems). Although the question for this Panel is the *relative* value of the programming categories, economic theory suggests that sellers of distant signals would not allow consolidation among buyers to result in a decrease in the absolute prices paid for programming. Rather, economic theory suggests that seller-side concentration would offset most (if not all) market power on the buying side. Hence, as I demonstrate in Appendix 1, even if copyright holders were able to restrict supply on distant signals, there is no reason to believe that cable system operators would spend more or less in absolute terms on any programming category than their Bortz-implied share. There certainly is no evidence to suggest that the sellers of sports programming would be less able to organize themselves to bargain effectively than the sellers of any other programming type. For these reasons, I conclude that the relative share results of the Bortz survey are likely to be accurate.

7. While the hypothetical market structure is unlikely to alter the Bortz results for the reasons I have set forth above, I have discussed in my Direct Phase testimony and again

below that the bargaining perspective of a seller of programming might lead to adjustments in the Bortz results.

II. Dr. Rosston's Regression Analysis

8. I have reviewed Dr. Rosston's testimony and his regression analysis in detail, and I have analyzed his theory and reproduced his results. Dr. Rosston estimates a regression of total royalties paid by cable systems in each 6-month accounting period between 1998 and 1999 as a function of the number of minutes broadcast of each programming category on the imported distant signals chosen, as well as other system-specific and demographic variables. He uses the coefficients obtained from this regression to calculate the implied share of royalties for each programming category. In particular, the value of programming category *i* is equal to the *ratio* of the product of the regression coefficient on the number of minutes of category *i* and the actual number of minutes of that category to the sum of the product of the regression coefficients on the number of minutes for each of the categories and the actual number of minutes for that category across all categories.

9. Dr. Rosston's results do not undermine the Bortz survey results. In his testimony, Dr. Rosston acknowledged that although his regression model and the methodology of the Bortz survey were different, the similarity between the two models' results was "very good."[2] His colleague, Dr. Ducey testified that the two studies were "corroborative."[3] Furthermore, the combined 1998-1999 Bortz results for sports programming (38.4 percent of royalties) are within the 95% confidence interval for Rosston's implied share for sports.[4]

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2. Rosston Transcript at 2919-2921.
3. Ducey Transcript at 1895-1896.
4. The Rosston regression coefficient for sports programming is $1.631 per minute, and its standard error is $0.267 per minute. To calculate the upper bound of the 95 percent confidence interval, I multiplied the standard

10. In considering the Rosston analysis, however, the Panel should understand that his models produce a range of possible valuations, and that there are flaws in the models that make them less reliable than the Bortz survey in terms of assessing relative values in a free market.

A. The Rosston Approach Provides a Range of Results

11. Although Dr. Rosston presented only one set of results – combining the years 1998 and 1999 – in his written testimony, his model reveals a range of results when the two years are considered separately. The full results for those two years separately are shown in Appendix 3. The imputed share values are as follows.

TABLE 1: SEPARATE 1998 AND 1999 ROSSTON REGRESSION RESULTS DSE>0

Programming Category	Implied Share of Royalties - 1998	Implied Share of Royalties – 1999	Implied Share of Royalties – 1998 & 1999
Program Suppliers	47.53%	48.10%	48.71%
Sports	30.34%	36.51%	32.56%
Commercial TV	13.33%	8.57%	10.90%
Public Broadcasting	8.68%	6.26%	7.48%
Devotional	0.00%	0.00%	0.00%
Canadian	0.00%	0.00%	0.00%
Low Power	0.00%	0.44%	0.22%
Mexican	0.12%	0.13%	0.12%
Total	100.00%	100.00%	100.00%

12. Estimating 1998 and 1999 separately yields significant changes in the estimated coefficients (and therefore the imputed share values), and in some cases the coefficient estimates are not significantly different from zero.[5] For example, the estimates of the implied share for commercial broadcasters when the two years are broken out (and Low Power and Mexican

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error by 1.96 (the standard normal distribution; see e.g. Rosston Testimony, Transcript at p. 2870) and added the result to $1.631, which yields $2.154. Using this coefficient for sports in Rosston's Table 3 generates an implied share for sports of 38.94% (including Mexican and Low Power signals).

5. The estimate of the Canadian coefficient is not significant in 1998 and 1999. The estimate of the commercial television coefficient is not significant in 1999.

signals are removed) falls from 13.35 percent in 1998 to 8.62 percent in 1999.[6] Indeed, the coefficient on the number of commercial broadcasting minutes in 1999 is not statistically significant—that is, Rosston's model cannot reject the hypothesis that the contribution to royalty spending of an additional minute of commercial broadcasting in 1999 was $0. Consequently, Rosston's model shows commercial broadcasters' share going from possibly 13.35 percent in 1998 to 0 percent in 1999. The implied share for sports programming is 30.38 percent in 1998 and increases to 36.72 percent in 1999.[7]

B. Rosston's Two Models

13. In his written testimony, Dr. Rosston presented estimates from a sample of cable systems with distant signal equivalents (DSEs) greater than zero ("Greater-Than-Zero-DSE model"). In an appendix, he presented the results of a regression from a sample of cable systems with DSEs greater than or equal to one ("Greater-Than-Or-Equal-to-One-DSE model"), but he did not show the implied royalty shares from this exercise. Table 2 shows how Dr. Rosston's results change.

TABLE 2: ROSSTON'S REGRESSION RESULTS

Programming Category	DSE > 0	DSE ≥ 1
Program Suppliers	48.71%	47.07%
Sports	32.56%	36.87%
Commercial TV	10.90%	9.98%
Public Broadcasting	7.48%	5.73%
Devotional	0.00%	0.00%
Canadian	0.00%	0.00%
Low Power	0.22%	0.22%
Mexican	0.12%	0.13%
Total	100.00%	100.00%

6. *See* Appendix 3.

7. I have also performed the same analysis on Dr. Rosston's alternative "Greater-Than-Or-Equal-To-One-DSE Model." The results are presented in Appendix 4.

The differences in the results from these two regressions are statistically significant.[7] Those results are shown in Appendix 2.

14. In Question 6, the Panel has asked the claimants to consider whether it would be appropriate to average Dr. Rosston's regression results for his Greater-Than-Zero-DSE and Greater-Than-Or-Equal-to-One-DSE models. The answer to this question is no. Because the data used in the two models overlap, they cannot be averaged. However, if the Panel is going to consider both models, it should consider both of them equally.

15. Dr. Rosston argues that the "Greater-Than-Zero-DSE" model is superior because it includes more data than the alternative model (7,635 observations versus 6,876 observations).[8] This argument is unpersuasive because the marginal information gleaned from the extra 759 observations is likely small. Moreover, both models attribute *equal* value to all programming minutes of each type purchased by the cable operator despite the fact that the prices of distant signals vary because of the copyright royalty rate schedule. Pooling royalty payments that result from these different rates therefore combines some signals that were purchased at higher prices (implying *higher* marginal values) with others that are purchased at lower rates. Because Rosston's "Greater-Than-Or-Equal-to-One-DSE" Model partially eliminates a category of programming that was acquired at zero marginal prices, that model is not subject to this particular problem to the same degree as his "Greater-Than-Zero-DSE" model. Hence, if the

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7. Statistical significance in this context is measured with a "Wald test." That test on Rosston's "Greater Than Zero DSE" benchmark model reveals that the coefficients on (1) a dummy variable that is equal to one whenever the MSO purchased one or more DSEs and (2) the interaction of that dummy with every programming category are jointly statistically significant. Hence, one can reject the hypothesis that the coefficients (and hence implied royalties) on types of programming minutes of all systems with greater than zero DSEs are the same as the coefficients on types of programming minutes of systems with greater than or equal to one DSE (F-statistic = 2.39). The regression results for the Wald test are presented in Appendix 2.

8. Rosston Transcript at 2847.

Panel considers the Rosston approach to be informative, it should give no less weight to the "Greater-Than-Or-Equal-to-One-DSE" model as it does the "Greater-Than-Zero-DSE" model.

C. Rosston's Model Contains Some Inherent Problems

16. As the Panel appears to recognize from its questions, there are a number of problems with Rosston's model that make it a much less reliable indicator than the Bortz survey of relative free market value of the distant signal program types. These problems include, among others, that the model arbitrarily allocates spending in proportion to programming minutes, that the model does not consider the *marginal* cost of acquiring the last DSE conditional on having already acquired DSEs, that the model is not properly specified, and that there is insufficient variation in the dependent variable (royalty spending) to produce meaningful estimates because most MSOs choose one DSE.

17. The Bortz survey seeks to obtain an answer to "What share of a budget would a cable operator allocate to a particular programming category if it could transact with the copyright holders directly?" The Rosston regression answers a different question: "How does the cable operator's total copyright payments relate to the shares of programming on the imported signals that he chooses?" The Bortz survey *directly* reproduces the hypothetical market conditions supposed by the Panel by using experimental spending patterns whereas Dr. Rosston's regression analysis *indirectly* relates actual spending to shares of program minutes on the distant signals.

18. As I have explained in previous testimony, the Bortz survey measures the *relative* value of each programming category to a cable system operator. The relationship between these measures and relative marginal values depends on the measure of elasticity of the demand curves

for the different categories of programming.[9] An analysis of aggregate spending patterns of cable operators, such as the Rosston regression, is hampered by the fact that actual aggregate spending is not disaggregated across programming categories. In other words, in the current market, the cable system operator cannot pick and choose the programming type and amount that he wants to purchase. Hence, the ratio of actual aggregate spending on sports programming to commercial television cannot be measured with actual aggregate spending data. The best that the regression analysis can do is try to explain variations in *aggregate* spending—that is, spending across all programming categories—among cable operators with variations in the distribution of *minutes* across program categories.

D. Rosston's Estimate of PBS' Share of Royalties Is Inflated

19. Dr. Rosston combines royalties paid under the basic fund and the 3.75 fund in his regression analysis. Because systems carrying a distant PBS signal never pay the 3.75 rate for that signal, and because Dr. Rosston combines purchases of independent signals purchased under the 3.75 fund with purchases of PBS, Dr. Rosston's model overstates the marginal contribution of PBS. A simple example highlights this error. Suppose a cable system purchased one PBS distant signal and one independent signal under the 3.75 fund. Suppose further that the *marginal* cost to acquire the PBS signal was $1,000 and the marginal cost to acquire the independent signal under the 3.75 fund was $16,000. Suppose that the allocation of minutes across the independent signal were 90 percent movies and syndication and 10 percent sports programming. Rosston's model would relate the $17,000 in royalties to the various programming categories as

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9. In particular, if the elasticities for the various types of programming are equal, and if the demand curves for the various programming types are linear, then the total value of programming for each category relative to the total value of all programming is equal to the marginal, or marketplace, value of programming for each category relative to the marginal value of all programming.

follows: PBS would be credited with 50 percent of total minutes imported, movies and syndication would be credited with 50 percent of total minutes imported x 90 percent of the minutes, or 45 percent, and sports programming would be credited with 50 percent of total minutes imported x 10 percent of the minutes on the independent signal, or 5 percent. This would lead to estimates of the signal values that would grossly overstate the value of PBS programming because it would appear that half of the $17,000 is attributable to PBS whereas the signal only cost the operator $1,000. The sports programming may be extremely valuable, but it would appear from this approach that only 5 percent or $850 is attributable to sports when, in fact, the value to the cable operator is the lion's share of the $16,000 paid for the independent distant signal.

20. In Question 8, the Panel asks whether "it would be necessary to give PTV a larger share of the Basic Fund than shown in Dr. Rosston's table in order for PTV to receive that share of the total royalty pool." In light of the PBS bias in the model—essentially giving PBS "credit" for 3.75 Fund payments, no such adjustment should be performed.

E. Rosston's Model Does Not Account for the Supposed "Seller's Side" Problem.

21. As I have testified, one of the criticisms from the 1990-92 Panel's report was that the Bortz survey does not account for the seller's side of the market. Because the "prices" that Rosston analyzed were set by the Copyright Act and subsequent decisions by those implementing it, his study is susceptible to the same criticism. For example, Rosston's Greater-Than-Zero-DSE model results in an estimated share of approximately 10.9% for Commercial TV. Commercial broadcasters, however, urged Congress to enact legislation that would permit regulation of the rates that cable operators charge for the tier of service that includes broadcast signals (and that generates the revenues used in calculating the Section 111 compulsory licensing

royalties). Once that legislation was enacted (the 1992 Cable Act), the broadcasters urged the Federal Communications Commission to reduce the monthly fee that cable subscribers charged for basic service from approximately $16 to $4.50[10] — notwithstanding that such a reduction would have significantly reduced the cable royalty fund and thus the cable royalties that broadcasters receive. Thus, while Rosston allocates 10.9% to Commercial TV, "supply side" considerations suggest that commercial broadcasters would be willing to accept substantially less than that amount of the market for commercial broadcast signals. Rosston's study does not account for those considerations.

III. TIME STUDIES DO NOT PROVIDE VALID ESTIMATES FOR ROYALTY ALLOCATIONS

22. I have reviewed Dr. Fratrik's testimony regarding his study of time of programming on distant signals. In particular, Fratrik collected the programming data for distant signals on "randomly" selected dates from the 1992, 1998, and 1999 accounting periods. He allocated each program to a program category and calculated the total minutes of programming on these dates in cases where they were carried on distant signals. Fratrik then calculated the subscriber-weighted shares that each programming category represented of all the programming carried on distant signals on those dates in each accounting period.

23. Fratrik's analysis shows that sports minutes changed relatively little from 1992 to 1998-1999. His calculations show that sports' share was 4.75% in 1992 and 4.91% in 1998-1999. Commercial TV has gone from 8.79% in 1992 to 13% in 1998-1999. PTV has gone from 5.04% in 1992 to 14.87% in 1998-1999. Even if one knew that Commercial TV programming, for example, had a certain value to cable operators with only eight percent of the program time

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10. See Written Testimony of Thomas Hazlett at 14 and JSC Exhibit 2.

(weighted by subscribers), one could not infer that increasing the share of time to thirteen percent would result in a 62 percent increase in value of the programming.

24. In his testimony for the public television claimants (PTV), Dr. Leland Johnson estimated the carriage frequency of each distant signal, weighted by subscribers, in 1992, 1997, 1998, and 1999. Dr. Johnson then calculated the relationship between valuation and "subscriber instances of carriage" by estimating a ratio between his instances of carriage estimate for 1992 and the CARP's award for PTV in 1992. He applied this ratio to his subscriber instances of carriage estimates for 1998 and 1999 to calculate estimated PTV royalty shares of 10.3 percent and 10.7 percent in each year, respectively. Unfortunately, Dr. Johnson's analysis is merely an alternative form of the time studies and suffers from the same types of problems as the Fratrik study. It does not show changes in value to cable operators.

Conclusion

25. With the exception of the Bortz study, the other studies discussed in my testimony (including Dr. Rosston's study) attempt to infer from an analysis of relative programming time on the imported distant signals what the allocation of royalty payments would look like in a hypothetical free market. Unfortunately, because individual categories of programming are purchased together on most distant signals, the value of this programming is not related to its share of time on the signal. In addition, because those purchases are made at different, regulated rates, it is difficult to estimate the actual allocation of royalty payments across programming categories. Even if one could estimate the actual allocation precisely, one would then need a theoretical model to map the allocations from the regulated market to the hypothetical market. The Bortz study is not subject to those problems because the allocation of (real) budgets are

based on a hypothetical free market and it does not require the Panel to disentangle the bundled purchase decisions of MSOs at different rates.

I declare under penalty of perjury that the foregoing is true and correct to the best of my knowledge and belief.

Dated: June 20, 2003

Robert W. Crandall

APPENDIX 1

APPENDIX 1: THE BILATERAL MARKET POWER BETWEEN DISTANT SIGNAL PROGRAMMERS AND CABLE OPERATORS

26. Even if one were to assume that some set of distant-signal copyright holders have market power, it would still not be possible to conclude that they actually exercise any power over price. For example, one might characterize the relationship between distant-signal copyright holders and cable operators as a case of bilateral monopoly. Bilateral monopoly is a situation in which a downstream monopolist (in this case, the cable operator) requires a particular good or service as a factor of production (in this case, a distant-signal program), and is the sole purchaser of that good or service from an upstream monopolist (in this case, the distant-signal copyright holder).[11] Figure 2 graphically depicts a bilateral monopoly, in which a monopoly producer sells a good to a monopsony purchaser that is used as an input in the sale of some good in a downstream market.[12]

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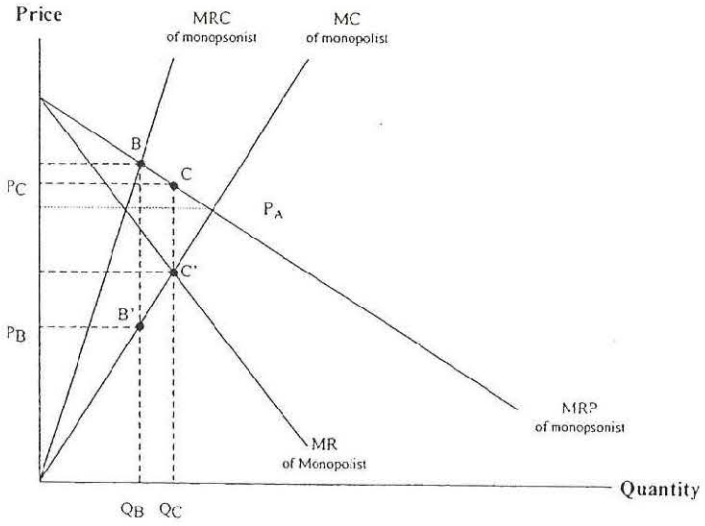
11. *See, e.g.*, DOMINICK SALVATORE, MICROECONOMICS 456 (Harper Collins, 2d ed. 1994). For a standard depiction of bilateral monopoly in economics literature, see Arthur L. Bowley, *Bilateral Monopoly*, 38 ECON. J., 651 (1928). *See also* Paul W. Dobson & Michael Waterson, *Countervailing Power and Consumer Prices*, 107 ECON. J. 418 (1997).

12. For a standard depiction of bilateral monopoly in economics literature, see Arthur L. Bowley, *Bilateral Monopoly*, 38 ECON. J., 651 (1928). *See also* Paul W. Dobson & Michael Waterson, *Countervailing Power and Consumer Prices*, 107 ECON. J. 418 (1997).

FIGURE 2: THE BILATERAL MARKET POWER
BETWEEN DISTANT SIGNAL PROGRAMMERS AND CABLE OPERATORS



27. Under the case of bilateral monopoly, the monopoly supplier of a distant-signal program will not supply the input for a price and quantity combination that is below its marginal cost curve (*MC*), that is—it will never sell a unit of the input for negative profit. The monopsony buyer of distant-signal programs, on the other hand, will be unwilling to buy the input at any price-quantity combination that is above its marginal revenue product curve (*MRP*), which is to say that it will not purchase a distant-signal program for a price that is higher than the marginal revenue that can be earned from its use. Whereas the monopsony cable operator will want to maximize profits by purchasing Q_B of the input at price P_B, as represented by point *B'*, the monopoly supplier of distant-signal programs will want to sell Q_C of the input at price P_C, as

represented by point C.[13] It is therefore not possible to determine the output and price that will result in the case of bilateral monopoly.[14]

28. All that can be said is that the output and price will generally occur somewhere within the shaded trapezoid $B'C'BC$.[15] The final output-price pair will depend on the relative bargaining power of the two sides. The bargaining strength on the part of the distant-signal programming supplier will erode the ability of the cable operator to select a price-output point close to B'. Thus, the countervailing bargaining power of the supplier vis-à-vis the purchaser of distant-signal programming will force the price of the input away from P_B, and up towards the competitive market price, P_A. If the bargaining power of the distant-signal copyright holder is sufficiently strong, then the copyright holder may even negotiate a price that is above the competitive market price. Hence, it is not reasonable to assume that selling power of the distant-signal copyright holders is a sufficient condition for supra-competitive prices.

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13. The wholesaler maximizes its profits at Q_B, the quantity at which the cost of obtaining one additional unit of input is just equal to the revenue that input will generate for the wholesaler ($MRC = MRP$). Because the MC curve represents the lowest price at which the supplier will sell this quantity, P_B is the corresponding profit-maximizing price for wholesaler. The supplier maximizes its profits at Q_C: the quantity at which marginal revenue equals marginal cost. Because the MRP curve represents the highest price that the monopoly wholesaler will pay for any quantity of input, P_C is the profit-maximizing price for the supplier.

14. The monopsonist and the monopolist will each give away the potential profit—that is, the triangle to the right of CC' if one or the other prevailed in setting the price and let the other choose the output.

15. *Id.* Note that the quantity that maximizes the monopsonist's profits is not necessarily less than the quantity that maximizes the monopolist's profits. The relative position of these points is determined by the elasticities of the AC and ARP curves. If the ARP curve is more elastic than the AC curve, then the monopsony outcome will occur to the left of the monopoly outcome, whereas if the ARP curve is less elastic than the AC curve, the monopsony outcome will occur to the right of the monopoly outcome.

APPENDIX 2: ROSSTON REGRESSION ON SYSTEMS WITH GREATER THAN ZERO DSES WITH DUMMY ON SYSTEMS WITH GREATER THAN OR EQUAL TO ONE DSE

Explanatory Variables	Dependent Variable: Total Royalty Fee Paid by System in Accounting Period
	----Coefficient----
	----(Standard Error)[1]----
	Ordinary Least Squares
Minutes of Program Supplier Programming	0.001
	(0.096)
Minutes of Sports Programming	3.263*
	(1.939)
Minutes of Commercial TV Programming	0.096
	(0.144)
Minutes of Public Broadcasting Programming	-0.006
	(0.026)
Minutes of Devotional Programming	-1.288
	(1.679)
Minutes of Canadian Programming	-0.057
	(0.061)
Minutes of Low Power Programming	0.155***
	(0.057)
Minutes of Mexican Programming	0.264***
	(0.044)
Indicator for Carriage of One or More DSEs	-3730.203***
	(1141.871)
Indicator for Carriage of One or More DSEs x Minutes of Program Supplier Programming	0.151
	(0.095)
Indicator for Carriage of One or More DSEs x Minutes of Sports Programming	-1.383
	(1.969)
Indicator for Carriage of One or More DSEs x Minutes of Commercial TV Programming	0.049
	(0.158)
Indicator for Carriage of One or More DSEs x Minutes of Public Broadcasting Programming	0.071**
	(0.030)
Indicator for Carriage of One or More DSEs x Minutes of Devotional Programming	0.976
	(1.681)
Number of Subscribers (Previous Accounting Period)	0.765***
	(0.032)
Number of Activated Channels (Previous Accounting Period)	34.557**
	(17.627)
Average Household Income in Designated Marketing Area	0.083
	(0.055)
Count of Local Channels	-284.495*
	(162.103)
Indicator for Special 3.75 Royalty Rate	13682.570***
	(1974.962)
Indicator for Carriage of Partially Distant Signal	-5547.429***
	(827.780)
Indicator for 1998-2 Accounting Period	-193.376

APPENDIX 2

	(605.314)
Indicator for 1999-1 Accounting Period	243.209
	(728.081)
Indicator for 1999-2 Accounting Period	-1128.142
	(724.141)
Constant	-3911.060*
	(2097.155)
R-Squared	0.703
Number of Observations	7,529

Wald test coefficient constraints:

Indicator for Carriage of One or More DSEs = 0

Indicator for Carriage of One or More DSEs x Minutes of Program Supplier Programming = 0

Indicator for Carriage of One or More DSEs x Minutes of Sports Programming = 0

Indicator for Carriage of One or More DSEs x Minutes of Commercial TV Programming = 0

Indicator for Carriage of One or More DSEs x Minutes of Public Broadcasting Programming = 0

Indicator for Carriage of One or More DSEs x Minutes of Devotional Programming = 0

F(6,7505) = 2.39

Prob >F = 0.0260

Notes: [1]Heteroscedasticity corrected standard errors are reported in parentheses; * Indicates that results are significant at the 90 percent confidence level; ** Indicates that results are significant at the 95 percent confidence level; *** Indicates that results are significant at the 99 percent confidence level; Sample was restricted to Form 3 systems that had positive distant signal equivalents and reported programming minutes. The interactive variables between the dummy variable for DSE greater than or equal to one and programming minutes for the Canadian, Mexican, and Low Power categories are dropped from the regression model because no systems with less than one DSE carry any programming from those three categories.

APPENDIX 3

APPENDIX 3: SEPARATE REGRESSIONS FOR 1998 AND 1999

Royalty Share Allocation
Form 3 Systems with Positive Distant Signal Equivalents
Rosston's Corrected Dataset
1998 Only

Programming Category	Value of Additional Minutes	Total Minutes Associated with Programming Category	Value of Minutes	Implied Share of Royalties	Implied Share of Royalties Excluding Mexican and Low Power
Program Suppliers	0.148***	91,533,578	13,579,610	47.53%	47.59%
Sports	1.819***	4,765,837	8,668,809	30.34%	30.38%
Commercial TV	0.181**	21,054,837	3,808,702	13.33%	13.35%
Public Broadcasting	0.079***	31,496,184	2,478,564	8.68%	8.69%
Devotional	-0.298***	4,900,542	0	0.00%	0.00%
Canadian	-0.073	3,255,607	0	0.00%	0.00%
Low Power	-0.007	151,200	0	0.00%	
Mexican	0.246***	144,180	35,495	0.12%	
Total		157,301,964	28,571,181	100.00%	100.00%

Note: Asterisks denote statistical significance of coefficient at: * 10%, ** 5%, and ***1% level of confidence.

Royalty Share Allocation
Form 3 Systems with Positive Distant Signal Equivalents
Rosston's Corrected Dataset
1999 Only

Programming Category	Value of Additional Minutes	Total Minutes Associated with Programming Category	Value of Minutes	Implied Share of Royalties	Implied Share of Royalties Excluding Mexican and Low Power
Program Suppliers	0.152***	91,554,504	13,945,637	48.10%	48.37%
Sports	1.596***	6,633,719	10,585,663	36.51%	36.72%
Commercial TV	0.115	21,518,385	2,484,657	8.57%	8.62%
Public Broadcasting	0.056***	32,611,357	1,814,199	6.26%	6.29%
Devotional	-0.331***	5,163,279	0	0.00%	0.00%
Canadian	-0.039	2,896,353	0	0.00%	0.00%
Low Power	0.192***	665,280	127,505	0.44%	
Mexican	0.268***	136,560	36,665	0.13%	
Total		161,179,437	28,994,326	100.00%	100.00%

Note: Asterisks denote statistical significance of coefficient at: * 10%, ** 5%, and ***1% level of confidence.

APPENDIX 4

APPENDIX 4: SEPARATE REGRESSIONS FOR 1998 AND 1999 ON GREATER-THAN-OR-EQUAL-TO-ONE-DSE MODEL

Royalty Share Allocation
Form 3 Systems with Distant Signal Equivalents Greater Than or Equal to One
Rosston's Corrected Dataset
1998 Only

Programming Category	Value of Additional Minutes	Total Minutes Associated with Programming Category	Value of Minutes	Implied Share of Royalties	Implied Share of Royalties Excluding Mexican and Low Power
Program Suppliers	0.145***	89,206,593	12,918,069	45.51%	45.56%
Sports	2.109***	4,738,526	9,993,835	35.20%	35.25%
Commercial TV	0.181**	19,657,538	3,553,086	12.52%	12.53%
Public Broadcasting	0.078***	24,120,769	1,885,897	6.64%	6.65%
Devotional	-0.290***	4,850,412	0	0.00%	0.00%
Canadian	-0.078	3,255,607	0	0.00%	0.00%
Low Power	0.000	151,200	0	0.00%	
Mexican	0.258***	144,180	37,175	0.13%	
Total		146,124,824	28,388,062	100.00%	100.00%

Note: Asterisks denote statistical significance of coefficient at: * 10%, ** 5%, and ***1% level of confidence.

Royalty Share Allocation
Form 3 Systems with Distant Signal Equivalents Greater Than or Equal to One
Rosston's Corrected Dataset
1999 Only

Programming Category	Value of Additional Minutes	Total Minutes Associated with Programming Category	Value of Minutes	Implied Share of Royalties	Implied Share of Royalties Excluding Mexican and Low Power
Program Suppliers	0.153***	89,156,314	13,611,762	46.60%	46.87%
Sports	1.795***	6,595,713	11,840,636	40.54%	40.77%
Commercial TV	0.109	20,158,874	2,192,118	7.51%	7.55%
Public Broadcasting	0.055**	25,519,299	1,398,230	4.79%	4.81%
Devotional	-0.324***	5,105,832	0	0.00%	0.00%
Canadian	-0.037	2,896,353	0	0.00%	0.00%
Low Power	0.190***	665,280	126,656	0.43%	
Mexican	0.281***	136,560	38,372	0.13%	
Total		150,234,225	29,207,775	100.00%	100.00%

Note: Asterisks denote statistical significance of coefficient at: * 10%, ** 5%, and ***1% level of confidence.

Certificate of Service

I hereby certify that on Monday, February 12, 2018 I provided a true and correct copy of the Robert Crandall Written Rebuttal Testimony (JSC Written Direct Statement Vol. II) to the following:

MPAA-represented Program Suppliers, represented by Lucy H Plovnick served via Electronic Service at lhp@msk.com

Spanish Language Producers, represented by Brian D Boydston served via Electronic Service at brianb@ix.netcom.com

Devotional Claimants, represented by Arnold P Lutzker served via Electronic Service at arnie@lutzker.com

Canadian Claimants Group, represented by Victor J Cosentino served via Electronic Service at victor.cosentino@larsongaston.com

American Society of Composers, Authors and Publishers (ASCAP), represented by Sam Mosenkis served via Electronic Service at smosenkis@ascap.com

Broadcast Music, Inc. (BMI), represented by Jennifer T. Criss served via Electronic Service at jennifer.criss@dbr.com

Public Broadcasting Service (PBS), represented by Dustin Cho served via Electronic Service at dcho@cov.com

SESAC, Inc., represented by Christos P Badavas served via Electronic Service at cbadavas@sesac.com

National Public Radio, Inc. (NPR), represented by Gregory A Lewis served via Electronic Service at glewis@npr.org

Multigroup Claimants, represented by Brian D Boydston served via Electronic Service at brianb@ix.netcom.com

National Association of Broadcasters (NAB), represented by John Stewart served via Electronic Service at jstewart@crowell.com

Signed: /s/ Michael E Kientzle